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WASHINGTON LETTER.

WASHINGTON, MARCH 19, 1890.

CONFERENCE OF AMERICAN NATIONS.—The Conference of American Nations which began in January is practically at an end. Although newspaper reporters and the public were not accorded attendance, it is understood that a vast amount of valuable information was gathered, and that the discussions, as might have been expected from the distinguished composition of the body, were of a very high order.

It will not be a difficult matter to summarize the conclusions of the conference. Reports have been made and adopted on the subjects of railroads, weights and measures, sanitary regulations, international law, patents and trade marks, arbitration, steamship lines, etc. As to coinage there will hardly be an agreement, because the South Americans favor unlimited coinage and the United States membership on the committee is divided, Mr. Estee of California favoring unrestricted silver coinage, and Mr. Coolidge of Massachusetts opposing it. More discussion and longer sessions have been devoted to the consideration of a customs union than to any other subject. The difficulty in agreeing to a report is due to the rival interests of the nations concerned. The Spanish-American governments derive their revenues from taxing imports and exports. They levy duties on all we send them, while we admit free 80 per cent. of what we get from them. Certain articles, such as flour,

provisions, clothing, petroleum and lumber, which those countries do not produce, they are willing to admit duty free or for large reductions if we, in return, admit free their sugar and carpet wool. The United States member, Mr. Henderson, is willing to concede free sugar but not free wool. The majority of the committee believe that the principle of unrestricted reciprocity is acceptable, and that its adoption would, in all probability, bring about as favorable results as those obtained by free trade among the different States of this Union. A customs union on this basis, however, they deem impracticable as a continental system, at present. But if it is not easy to arrive at once at unrestricted reciprocity, that end might be gradually obtained. The first step in that direction is the negotiation of partial reciprocity treaties among the American nations, whereby each may agree to remove or diminish its respective import duties upon some of the natural or manufactured products of one or more of the other nations in exchange for similar and equivalent advantages. If good results should follow, the number of articles on the free list might be enlarged from time to time. Therefore the majority proposes ; "To recommend to such of the governments represented as may desire partial reciprocity, to make commercial treaties with one or more of the American countries, upon such a basis as may be acceptable in each case, taking into consideration the special situation, conditions and interests of each country." The minority presented a report stating that the committee had been unanimous in advising the Conference to reject the idea of a customs union.

The report on the project of a railroad down the back-bone of the hemisphere is the only one adopted without amendment. The first proposition is that a "railroad connecting all or a majority of the nations represented will contribute greatly to the development of the moral relations and material interests of said nations." The second: "That the best means adapted to begin and carry out its execution is the appointment of an international commission of engineers to study the possible routes, determine their true length, estimate their respective cost, and compare their reciprocal advantages." Other propositions follow relating to the composition of the commission, routes, use of existing railways, proposals for and expense of surveys and construction, subsidies, cessions of lands, or guarantees. Of course this railway along the Cordilleras and Andes would develop the Latin Americans more than anything that has been devised. But it would extend our trade relations, increasing the market for our goods and bringing to us the products of far away democracies—the guano of Peru, the gutta serena of the Amazon, the coffee of Maracaibo and innumerable articles from every country south of the Gulf.

The committee on Communication on the Atlantic recommend the establishment of subsidized fast bi-monthly passenger, mail and freight steamer service between the United States and Rio de Janeiro, Montevideo and Buenos Aires; also an auxiliary bi-monthly freight line. The contracting governments to contribute to the fast lines in the following proportions: The United States 60 per cent.; the Argentine Republic, 17½ per cent.; Brazil, 17½ per cent.; Uruguay, 5 per cent.

Contracts for the service to be solicited by advertisements in papers in each contracting country and in awards due consideration to be given to existing contracts with Brazilian lines. In consideration of the higher aid to be paid by the United States, the contracting parties are to accept only vessels constructed in this country. The committee also recommends the encouragement of direct cable lines to connect the countries interested, with a good telegraphic service at equitable rates.

On the subject of patents and trade-marks the committee finds in the three treaties on copyright, trade-marks and patents subscribed to by the representatives of the seven South-American republics, who attended the recent congress of Private International Law at Montevideo, the principles which, in its opinion, should be adopted throughout this continent. In the treaties referred to, literary and artistic works, trade-marks and patents of invention are clearly defined; in the same manner are prescribed the rights of authors and artists, proprietors of trade-marks and inventions, which the contracting parties guarantee and protect; the formalities to be observed in obtaining this protection and guarantee; the limits of said rights, and the manner in which they may be exercised. In respect to literary and artistic copyrights it is provided that authors and artists shall enjoy the rights accorded them by the law of the State in which the original publication or production of their works took place; but that no State is obliged to recognize such rights for a longer time than that allowed to authors who obtain the same right in that State. Rights to trade-marks granted in one country are recognized in the others, but with due regard to their own laws; and

to enjoy the right to an invention for which a patent has been obtained in any one of them, it is necessary to have the patent registered in any other in which its recognition is asked for in the form prescribed by its laws. With regard to the duration of patents the same principle is established which was previously mentioned in relation to literary and artistic copyrights, and it is moreover provided that the duration of the patent may be limited in each State to the period prescribed by the laws of the State in which the patent was first granted, if such period be the shorter. It is also provided that questions arising on the priority of inventions shall be settled according to the date of the application for the respective patents in the country where they were granted.

The report of the Committee on International Law, as adopted by the Conference, says: That the formulation of a code of private international law on civil and commercial matters would require more time and attention than can now be given to it. Its discussion would be a work of many months, and this, too, without any certainty that the end aimed at would be brought about, because, owing to the complexity of the subject, and to the number and closeness of its relations to the internal legislation of each country, it would not be easy to reach off-hand an accurate conception of what the common interests demand. Fortunately the committee has found ready at hand as distinguished and complete a presentation of the subject as could be desired. That presentation is embodied in the treaties of civil and commercial law sanctioned by the South American Congress of private international law at Montevideo in 1888-89. The amplitude of the discussions had in that Congress,

the minute and careful study of every point and detail involved, the intelligent consultation and laborious study, which the reports and discussions show to have been bestowed upon the works of the most distinguished European and American writers, the just appreciation with which it has met, and, above all, the circumstance that it has already secured the adhesion of seven of the American nations, have powerfully influenced the committee in favor of embodying the work in question as the substance of what is to be recommended. The committee therefore submitted and the Conference adopted the following resolution : *Resolved*, That the governments represented in this Conference which as yet have not adhered to the treaties of private international law, civil law, commercial law, and law of proceedings adopted at the Congress which met at Montevideo on the 25th of August, 1888, be and they are hereby recommended to cause said treaties to be studied so as to render themselves able, within the year to be counted from the date of the termination of the labors of this Conference, to declare whether they do or do not adhere to the said treaties, and whether their adhesion to the same is absolute or qualified by some amendments or restrictions.

The sanitary measures recommended are those adopted by the Sanitary Congress of Rio de Janeiro in 1887 or the Congress of Lima in 1889.

The committees on postal and cable communication, on port dues, extradition, and banking have prepared reports which have not yet been conclusively acted upon.

It is one of the noblest outcomes of the Conference, and its best claim to remembrance by after times that it

seems to have provided a plan of arbitration between the nations of the hemisphere which will aid in putting a stop to the numerous costly wars between neighboring republics.

BULLETINS OF COAST AND GEODETIC SURVEY.—Mr. Charles A. Schott, assistant, etc., U. S. Coast Survey, has prepared tables* of the approximate times of culmination and elongation of the Pole-star and of its azimuth at elongation at any time between the years 1889 and 1910 for any place within the United States between latitudes 25° and 50° north. These tables are designed for the use of the surveyor, to facilitate the determination of a meridian line and of the magnetic declination (variation of compass) by simple instrumental means and by a method easy of application.

Two other Bulletins are announced, but not yet published, viz.: No. 16—Description of two new transit instruments for longitude; constructed at the office of the Survey from designs by Edwin Smith, assistant. No. 17—The relation between the metric standards of length of the U. S. Coast and Geodetic Survey and the U. S. Lake Survey. By C. A. Schott and O. H. Tittman, assistants, etc.

Professor Mendenhall, Superintendent, has under consideration a re-determination of trans-Atlantic longitudes, making use of the new Mackay-Bennett cables.

WEIGHTS AND MEASURES.—*Tables for converting customary and metric weights and measures* is the title of a handy publication issued by the Coast Survey. It covers linear, square and cubic measures, and those of capacity and weight. One table converts customary

* Bulletin No. 14, U. S. C. and G. S.

measures into metric, and the other reverses this order. It contains also such units as the chain, square mile, fathom, nautical mile, the English gallon and bushel, etc. The tables are arranged so that any unit from 1 to 9 can be converted by inspection into metric or customary measures. Foot notes give considerable data relating to the standards of measurements in the United States.

The Verification of weights and measures is the subject of Bulletin No. 15 of the U. S. Coast and Geodetic Survey. The paper is written by Mr. O. H. Tittman, assistant, etc., and is intended to convey information to those who wish to have their length measures verified, or who desire a comparison of their weights and capacity measures. The paper is prefaced by a brief account of the circumstances which attended the construction of the National prototypes of the metre and kilogramme.

MAGNETIC CHARTS.—The United States Coast and Geodetic Survey has recently issued four magnetic charts, viz., (1) chart of annual change of the magnetic declination for the epoch January, 1890. (2) Isogonic chart of the United States for the epoch 1890. (3) Isogonic chart of Alaska and adjacent regions for the epoch 1890. (4) Chart of the magnetic meridians of the United States, for January, 1890, and the present annual change of the declination.

These charts will form part of the illustrations for the Annual Report of the Survey for 1887-88* and 1888-89. The first will accompany the 7th edition of an article entitled "Secular variations of the magnetic declin-

* Now passing through the press.

ation in the United States," etc. Since the last publication of this valuable paper in the Report of 1886, its contents have been enriched by the addition of 174 observations made at 15 (new) stations, and the tabular results have been brought up to date with predictions of the variation of the compass, at 109 principal places, extending to the year 1900. On this chart we find also delineated the positions of the line of no variation, the so-called *agonic* line, for the epoch 1797-1803, when at its extreme north-eastern position, for the epochs 1850, 1875 and 1890, thus exhibiting the progressive long period change in the direction of the needle. Two shaded lines or regions, one passing over Nova Scotia, the other skirting our Pacific Coast, indicate the positions where at the present time the needle is stationary and about to *reverse* the direction of its motion.

The second and third charts, as well as the fourth chart will accompany the second edition of the article "Distribution of the magnetic declination in the United States for the epoch 1890." The large number of observations collected from all sources, together with the Survey's own work since the appearance of the first edition in the Report for 1882, and in particular the late advance made in our knowledge of the secular change, called for an early issue of these charts for which the office has great demand. The larger of the two charts brings out in much detail the local deviations from the regular distribution of magnetism, and is of special interest to the surveyor; the smaller one will be appreciated by the navigator. To give an idea of the richness of the material, it may be stated that this edition embraces 900 new stations, and gives the declination, ob-

served and reduced to epoch, for nearly 3,237 places, of which 652 are beyond and near our boundary. It is by means of these charts and from the extensive tables by the aid of which they had been constructed, that the Survey supplies on its maps and charts for the time of publication, the declination or the variation of the compass, together with the annual change to be applied in order that the information may be brought up to any later date.

The last of the four charts mentioned is supposed to be the first one of its kind especially constructed for the area of the United States. It also presents certain selected curves of equal dip of the magnetic needle and of equal intensity of the horizontal component of the magnetic force. This last element has of late years come into demand in connection with the rapid development of applied electricity. The magnetic meridians exhibit directly the direction of the horizontal part of the magnetic force; in other words they give the direction of the pointing of a compass needle at any position of the line. These curves thus represent a physical fact and are of theoretical interest, whereas, the isogonic curves, from which they were directly derived, are wholly artificial, but specially fitted for practical use.

These charts are handsomely got up, and much of their clearness is due to printing in two colors, the body or topographical part being in a light blue, and the magnetic part of the information in black.

SIGNAL OFFICE.—The Chief Signal Officer has adopted a signal known as the "Information Signal," and forming one of the system of "Storm, cautionary and wind-direction signals." It consists of a yellow pennant of

the same dimensions as the red and white pennants (wind-direction signals), and, when displayed, indicates that the local observer has received information from the central office of a storm covering a limited area ; dangerous only for vessels about to sail for certain ports. The signal will serve as a notification to shipmasters that the necessary information will be given upon application to the local observer. Also, the signal at night for indicating westerly winds is now a *white* light above a *red* light.

The Weather Code used for enciphering the telegraphic weather reports has been revised and is now thoroughly satisfactory. It is more economical by forty per centum than any code ever used, and it is so arranged that after learning the key the cipher can be translated at sight and with greater speed than has ever before been possible.

A paper entitled "*Preparatory studies for deductive methods in storm and weather predictions*," by Professor Cleveland Abbe, is a popular and non-mathematical exposition of the laws of storms, with a view to their better prediction, and, in connection with a study of their diurnal variations, to constitute a deductive method of storm predictions. Professor Abbe, who is the assistant of the longest experience in the Signal Service, brings together in this memoir many new results, together with principles and conclusions formulated by him since the publication in 1859 of the memoir by Ferrel, which is recognized as the beginning of modern dynamic meteorology. The paper appears as Appendix No. 15 to the Annual Report of the Chief Signal Officer for 1889. Appendix No. 25 of this Report contains a list

of errata furnished by Prof. William Ferrel, and supplementary to his paper, *Recent Advances in Meteorology*, published in 1885.

HARBOR IN GULF OF MEXICO.—The Board of Army Engineers, appointed to make an examination of the north-west coast of the Gulf of Mexico, west of 93° , $30'$ W. longitude, and to report as to the most eligible point or points for an harbor to be of ample depth, width and capacity to accommodate the largest ocean-going vessels, and the commercial and naval necessities of the country, report, after an application of such severe tests, that Galveston harbor is the only one which may be made to fulfil all the requirements of the Act of Congress; but commend, nevertheless, the harbors at Sabine and Aransas passes as being worthy of great consideration and of vigorous prosecution of the works of improvement.

COLUMBIA RIVER.—Major W. A. Jones, U. S. A., supplies some geographical details of an undeveloped but remarkably fertile portion of the Northwest, in a recent "Report of the examination of the upper Columbia River." He says: "The Columbia River crosses the international boundary $26\frac{1}{2}$ miles west of the boundary between Washington and Idaho Territory, and after flowing through mountainous country for a distance of 106 miles in a direction a little west of south, it enters the great plain supposed to have been occupied by an inland sea for a long period subsequent to the lava flows, which cut off the main drainage through the Cascade Mountains. Immediately upon entering this basin it trends directly to the west along the northern border of the great plain for a distance of

105 miles, when it strikes the foot of the hills of the Cascade Mountains and is turned to the south along the western confines of that plain. This is one of the two big bends of the Columbia River, and that portion of the great plain enclosed between its two arms is widely known as the Big Bend country. It is remarkable for its fertility, and requires no irrigation, but is absolutely destitute of springs of running water. There is little doubt, however, that water will be found abundantly by boring through the rock strata. Through this country the river is very new, geologically, and flows in long reaches at a level of several hundred feet below that of the plateau it incloses. It is still rapidly carving its way through the unstable lavas and basalts which generally form its bed. But the places where the waterway has not yet been cut out sufficiently to allow the river to pass through freely are very numerous. These are the places where navigation is obstructed by rocks and rapids.

YUKON RIVER.*—In previous letters to the BULLETIN mention has been made of the preliminary survey of the frontier line between Alaska and British Columbia along the 141st meridian of west longitude, at or near where it crosses the Yukon River. It will be remembered that the Superintendent of the Coast Survey, early in the summer of 1889, organized two parties at the instance of the Department of State, with Capt. J. E. McGrath and Mr. J. H. Turner, officers of the Survey, in charge, to establish points on the Yukon and Porcupine rivers. As these parties did not altogether succeed in reaching their destination before the close

* See map at the end of Bulletin.

of the season, no reports other than those of the itinerary have been received.

Through the courtesy of the Superintendent, the Director of the United States Geological Survey was invited to send a representative with the surveying parties for the purpose of making geological observations in Alaska. Mr. Israel C. Russell, geologist of the survey, was assigned to that duty, and his "Notes on the Surface Geology of Alaska"* present the earliest scientific intelligence of that interesting expedition.

A glance at the contents of this paper reveals a wealth of information skilfully presented. The time spent in Alaska by Mr. Russell was about three months, during which he travelled about two thousand five hundred miles. He entered the country from the west coast *via* St. Michaels, and left it from the south-western coast *via* Lynn canal and Juneau. After reaching Fort Yukon he proceeded up the Porcupine River, but afterwards returned to Fort Yukon and continued the ascent of the Yukon to the mouth of the Pelly River. He journeyed in an open boat up the Yukon to the mouth of the Lewes, ascended that stream, passing through lakes Labarge, Tagish, Nares and Bennett to Lake Lindeman, crossed the Chilkoot pass on foot and reached the head of Taiya inlet, the extreme northern reach of Lynn canal.

The interior of Alaska, that is to say, the vast territory lying to the south of the Yukon River, while it is known to be of value on account of its deposits of gold, copper and coal, is practically as unexplored as the "dark

* Bulletin of the Geological Society of America, vol. 1, pp. 99-162, March 13, 1890.

continent." The two great enterprises which Mr. Russell thinks would greatly assist its settlement are (1) a survey of the Yukon delta, which would determine whether there is a channel by which ocean-going vessels can enter the river; and (2) a survey of the passes between the head waters of the Yukon and the coast. This would furnish the needful data for making trails and wagon roads from the sea-shore to the head waters of the great river system of the interior. There are four passes more or less practicable for this purpose, none of which have been surveyed. Mr. Russell is of opinion that the Taku pass, though not the shortest, is the most practicable.

The part of the paper which will most interest geographers is the author's proposed change in the nomenclature of the Yukon River. In writing about this river and its tributaries an unfortunate confusion in names is met. The early voyagers entered the country from the West and from the East, and ignoring aboriginal names applied different ones to the same head waters. When the connection of these fragmentary explorations was established a confusion in nomenclature resulted.

On the latest edition of the U. S. Coast Survey map the name Yukon is applied to the stream which flows from Lake Lindeman, or Crater Lake, and after passing through lakes Bennett, Tako, Marsh and Labarge is joined by the Pelly, Stewart and Porcupine rivers. Dr. G. M. Dawson, the eminent Canadian authority, claims* that the extension of the name Yukon so as to include the stream flowing from Crater Lake does vio-

* Report on an exploration in the Yukon district, 1887.

lence to the nomenclature proposed by early explorers, and, moreover, does not conform to the geography of the region. Dr. Dawson and Mr. Russell agree that Crater Lake is not the main source of the Yukon, but one of its secondary branches. On Dr. Dawson's map, in the report already referred to, what is known as the Yukon on the U. S. Coast Survey map is divided into three portions. From the sea to the mouth of the Porcupine River the name Yukon is retained; from the mouth of the Porcupine to the mouth of the Upper Pelly it is called Pelly; thence to Tagish Lake it is called the Lewes. The main source of the Lewes is considered to be the stream which enters the Tako arm of Tagish Lake.

"To one ascending the Yukon from the sea," Mr. Russell says, "it is evident that no change of name should logically occur where the main stream is joined by the Porcupine, as there is no perceptible change in its character at that locality. The same is true when the mouths of Stewart River and Pelly River are reached." About 150 miles above the mouth of the Pelly, the mouth of the Tes-lin-too (or, "Hootalinkwa" of miners, or, "Newberry" of Schwatka) is reached. *This* stream, Mr. Russell thinks, is the continuation of the Yukon and should share its name. "It flows," he says, "through a continuation of the same orographic valley that is occupied by the Yukon (or 'Lewes') below its mouth, while the Yukon (of the Coast Survey map) or the Lewes (of Dawson's map) above the junction is but a tributary stream, coursing through a narrow and poorly defined valley nearly at right angles to the main line of drainage. It seems evident to me," he contin-

ues, "that no unprejudiced observer could examine the junction without concluding that the Tes-lin-too should be regarded the main drainage channel." Accordingly he adopts in the "Notes" the name "Yukon" for the river from the mouth to its source, the source being "in the as yet unexplored region draining into Lake Teslin." The name "Lewes" he retains "for the stream on which Lake Labarge and the numerous lakes higher up the same system are situated."

Dr. Dawson, while admitting that the Tes-lin-too occupies the main orographic valley above its confluence with the Lewes, considers, for reasons stated in his report, the main source of the Yukon to be the Lewes, and the source of the Lewes at the headwaters of the Hotalinqu River.

CRUISE OF THE "THETIS."—Commander Charles N. Stockton recently gave to the National Geographic Society an account of the cruise of the *Thetis* in Arctic waters during the summer of 1889. This cruise was remarkable in several respects. The *Thetis* reached Mackenzie Bay in British North America, being the first Government vessel to carry the American flag in those waters. She also made the long stretch from Mackenzie Bay to Herald Island and Wrangell Land in one season, never before done, and she was the first vessel of any kind to follow the entire main coast line of Alaska from Fort Tongas in extreme south-eastern Alaska, to Demarcation Point in the Arctic Ocean.

The steamer left San Francisco, April 20th, and reached that port again December 8th, 1889. St. Matthew Island was visited with a view of ascertaining whether there were any shipwrecked persons there, and

to verify the statements made upon the charts that it was infested with polar bears. Old traces of these animals were found in abundance, but no evidences of their present existence. "This island," said Captain Stockton, "is probably the southern limit of the solid ice in winter in that part of Bering Sea." The Siberian coast was next touched by the expedition in an effort to gather news concerning the fate of the whaling vessel *Little Ohio*, which has been missing since the previous autumn. Finding no traces the *Thetis* passed through Bering straits to the Arctic Ocean. At the native village of Point Hope, two whalers were met with and the information obtained that the *Little Ohio* had been wrecked at this point and that the survivors were at the village. These men were taken on board. Cape Sabine was reached July 27th. Near by was a coal mine where the *Thetis* had coaled the summer before and this mine was still being worked by the natives. In the vicinity also was a stream called by the natives the Pitswagea, and known to but few whites, and not set down on any chart or map. The river is very winding, its general course being north-west. Its length is estimated to be over one hundred miles. A remarkable ice cliff was found on this river about twenty-five miles from the mouth. The glacier faces southward, and gales have deposited particles of soil and débris of plant along with the seeds upon the surface of the ice to a depth of from four inches to a foot. In the summer the vegetation is warmed to life in a remarkably short time, and the brown coat left by the receding snow is almost miraculously transformed to a robe of green, studded here and there with bright polar flowers. The river is gradually cutting into the

glacier. During the summer the ice melts away, leaving the protecting soil above like the eaves of a house. When it protrudes too far for the strength of the grass roots, it topples over into the river. At the freezing in September icicles form from the overhanging sod to the river ice below, making a narrow portico four miles in extent.

Captain Stockton gave an account of the building of the house of refuge at Point Barrow and of the assembling of the entire fleet of whaling and United States vessels at this point. Forty-seven vessels carrying the American flag and manned by about 1,200 men, had gathered within sight of the most northerly point of the United States. The *Thetis* got caught in the ice a short distance east of Point Barrow and was forced to remain there for five days.

The best landmark found both in Bering Sea and in coming from the Pacific was Akutan Island and volcano. The top of this volcano, which is at times active, is generally obscured by clouds, mist and smoke; but this in itself, in connection with the strongly outlined sides of the island and lower part of the volcano, presents features that would not escape notice in any but thick weather. Port Clarence is the best harbor before reaching the Arctic, where no harbors exist west of Herschel Island. It is now used as a rendezvous for a large portion of the Arctic whaling fleet. Seven steam whalers, sailing whalers, one trading vessel and a bark were found here by the *Thetis* on the 11th of July, 1889. There is no native settlement of any size in the bay, but natives assemble here from the surrounding country and islands for trade with the whale ships. On the Siberian coast of Bering Sea, Indian point (otherwise known as Cape

Tchaplin) which is quite a rendezvous for vessels, is a long, low point of shingle and sand, extending several miles to the eastward from the mainland with bold water upon both sides. The native village is a large and prosperous one with a population of about 350. They seem to be Eskimo and closely allied to the natives upon the Alaskan side. They seem intelligent, bright traders, good whalers, and generally more prosperous than the Alaskans.

As a collateral to Washington notes on Alaska it may be mentioned that an expedition is being organized by prominent publishing companies in New York to penetrate the vast tract of unexplored country lying between the Copper and Yukon rivers in central Alaska. Considerable care is being given to the proper composition of the party. The officers of the United States Coast Survey are interested in the plans for the explorations and will give all possible assistance. The necessary scientific instruments will be provided by Professor Mendenhall, who will also provide transportation for the party on the Government steamer *Patterson* as far as Chilkat.

THE GULF STREAM.—Lieut. J. E. Pillsbury of the Navy has, at the request of Prof. T. C. Mendenhall, Superintendent of the Coast Survey, written him a letter setting forth his views on the subject of the Gulf Stream and its variations. He says :

“I think the Gulf Stream does change its position to a slight amount, but not in the arbitrary manner or to the extent stated by some of the newspaper writers of late. . . . While it is probably a fact that, as a rule, a current from the Equator is warm, and one from the

Pole is colder than the surrounding waters, it is not always the fact that the warmest flowing water is from the south, nor that the coldest is from the north. . . . The mere presence of warm water does not necessarily show that a current exists, nor does a change in temperature show that there is a change in current. . . . The Gulf Stream probably has a vibratory motion, as evidenced by our anchorages at No. 1 station off Hatteras and as previously noticed off Rebecca Shoal, Fla. Anchored there, on the northern edge of the stream, riding to the wind with a gentle current, the latter would suddenly become strong and swing the vessel until she was stern to the wind, to remain but a short time, and then the current becoming weaker the wind would gain the ascendancy. This was repeated a number of times. I believe that the daily volume of the stream varies but little except from that due to declination of the moon. Along the northern coast, however, it is not always on the surface, but is, from an unknown cause, overrun by other currents. I think that its track through the ocean is absolutely fixed by law, and that its vibration is periodic, although the limit of the periodic change may vary to a trifling amount. The generally accepted belief that a wind blowing across the current changes the position of its axis is, I am convinced, erroneous. Every temporary wind, however, does transport water (chiefly by means of waves) and with it goes its heat or cold. The fact of finding gulf-weed within a few miles of Nantucket light-ship does not so much prove that the current is nearer our shores as it does that winds have prevailed in the direction from which it comes. Its home is in the

Sargasso Sea, from which it is drawn by the winds and sea. A small amount finds its way into the Caribbean Sea through the Antigua Passage, but most of it passes north of the West Indian Islands. The break of the waves has more effect on its movements than a current, unless the latter is very strong, and in the Gulf Stream itself it is seen stretching in long lines in the direction of the wind and sea, and not in the direction of the current, except only in the case of a rip at the meeting of the currents. Anchored on the edge of Florida Reefs with a strong wind blowing directly from the Gulf Stream, which was only a short distance away, its clear blue water was driven by the sea and overcame the cloudy reef-water, but no current accompanied it. In Key West harbor the water is usually cloudy. A southerly wind will cause a sea that will carry the clear water inshore, even in spite of an ebb-tide. The wind shifting to the opposite quarter will at once alter it to milky whiteness."

COLON.—The collapse of Colon since the suspension of work on the Panama canal seems to be complete. Vessels are scarcely seen in the harbor, where a few months before they were obliged to anchor for days waiting for dock room. The consul at Colon says that forty towns had sprung up on the line of the canal in almost as many miles, and that the local traffic on the isthmus reached vast proportions. These towns were populated with energetic people from all nationalities. Wages were high and labor incessant, day and night. This local business on the line of the canal has vanished, and the rank vegetation of the tropics is hiding dredges, railroad trains and contractors' paraphernalia

which had been left on the line as if work were to be resumed on the morrow. Rents have fallen off five hundred per cent. and nearly two-thirds of the business houses in Colon are closed up. Transit traffic has not suffered.

Congress provided in 1889 for "the repatriation of Americans who became destitute because of the collapse of the Panama canal." All who have applied for relief have been returned, mostly to New York.

BARRANQUILLA.—Mr. S. M. Whelpley, vice consul of the United States at Barranquilla, makes a strong claim for the commercial superiority of that city as against Carthagena, the capital of Colombia. The fame of the latter, he says, is largely due to its antiquity; and centuries of decay are plainly visible in the ancient buildings, walls and crumbling fortifications. Barranquilla is to the Magdalena River and its tributaries as New Orleans is to the Mississippi, the terminus and home port of all the largest class of river steamers, the chief port for entry and shipment, her merchants controlling, through their correspondents in the interior and abroad, at least three-fourths of the imports and exports from the interior States bordering the Magdalena and the Cauca rivers.

TALZERES ISLAND.—Talzeres Island, at the entrance of the Oronoco River, has been formed since the last survey of that river, and is not indicated on the charts. Situated eastward of the S. E. extremity of Cangrejo Island, it is about one and one-half miles in length in east and west direction, and covered with trees about twenty feet high. New islands are forming to the

northward and eastward of this one.—*U. S. Hy. Office, Notice to Mariners.*

PARAGUAY.—The recent land speculation in Paraguay has abated, and there is evident progress on the basis of real values. Roads are being improved, and bridges multiplied. The effort to diffuse popular education has not declined, the number of schools and attendance having greatly increased. Large amounts have been spent in the repairs of churches. Municipal improvements in Asuncion, such as pavements, new tramway lines, and electric lights are especially noticeable. Besides the five banks already existing, a new one has been created with a capital of eight million dollars, paper. It is authorized to issue notes to three times the amount of its paid-up capital, and besides its banking business will have a special section for encouraging colonization. Although the increase in immigration has been quite marked, much larger results are looked for. The Government has appropriated, to advance this object, four times the amount provided in 1888. The want of a direct communication with Europe is a serious obstacle in the way of the Government efforts to attract immigrants, and it is stated, moreover, that many who have this destination in view are met in Buenos Aires by agents of the Argentine immigration office, and induced to remain in the Argentine Republic. Several Americans who are now in Virginia are expected soon, accompanied by practical tobacco and cotton farmers with the best machinery. A land company has given land on certain conditions, and an effort will be made to make the venture successful.

Two new stations have been opened on the prolongation of the railway from Paraguari to Villa Rica, and the

entire line to Villa Rica is about completed. In March last the existing railway and the right to extend to Villa Encarnacion passed into the hands of London parties, and the stock of the company was subscribed for three times over. Plans have also been approved for the proposed line to connect Asuncion with Sucre, Bolivia, and it is reported that a company proposes to put on the river a special fast service of boats which will make the trip from Buenos Aires to Asuncion in three and a half or four days, instead of six or seven as at present.

SAMOA.—Commander Hunker, of the U. S. S. *Adams*, stationed at Apia, informs the Navy Department under date of December 30, 1889, that the affairs of the Samoan people seem to have been amicably settled, and that a large party of the most prominent of the opposition chiefs of Tamasese's party came to the official residence of Malietoa, and formally acknowledged their allegiance to Malietoa. The natives and foreign residents consider the peace of the country as assured, and the German authorities are so well convinced of this that they do not consider the presence of a war vessel now necessary at Samoa. The German cruiser intended to sail on the 20th of January for Auckland, New Zealand, to remain away until the end of the "hurricane season."

An account of the disaster at Apia, in the hurricane of March 15th and 16th, 1889, has recently been published by the Navy Department. The public is familiar with most of the details of this calamity, but the violence of the storm which sacrificed the lives of fifty-two brave seamen, and wrecked two steamships of the Navy is something that landsmen feebly appreciate.

Congress, by an act approved February 19, 1890,

made provision for the relief of the sufferers by these wrecks, by directing the payment to each survivor of a sum equal to the losses sustained by them, not to exceed the amount of twelve months' pay, and to the surviving families or dependents of those who were lost in the wrecks, or who have since died, a sum equal to twelve months' pay. Ten thousand dollars were also appropriated for the removal of the remains of deceased officers and seamen to the United States. The Navy Department presented the native chief Seumann, who assisted in rescuing the officers and crew of the *Trenton*, a double-banked whale-boat with fittings, and suitable rewards to the men composing his crew. And to Fugi Hachitaro, who saved the life of Lieut. J. C. Wilson of the *Vandalia*, the Treasury Department has awarded the gold medal of the Life-Saving Service.

IRON CHURCH IN MANILLA.—The Recoleta Brotherhood of the Catholic Church in Manilla, Philippine Islands, is constructing in the district of San Sebastian an earthquake-proof church. The entire frame-work is of wrought iron, bolted together in the firmest manner, the fluted columns and buttresses being hollow. The walls are of double plate iron with a space of thirty inches between the plates. The dimensions of the edifice are : length 162 ft., width 70 ft., height to the top of the arches 52 ft., and to the spring of the same 34 ft. Two towers are each 19 ft. square by 170 ft. high. The total weight of the iron in the building is 1,600 tons. The material was made in Brussels. Total cost, \$350,000. It is expected that this structure will defy the most vigorous earth-shaking.

SIAM.—A company has been incorporated to build at

once a railroad from Bangkok *via* the town of Paknam, at the mouth of the Menam, to Petriu, a distance of about thirty miles. It will be the first railroad in Siam and is to be built exclusively by Siamese capital. A corps of engineers is engaged in running a line northward towards Burma.

The city of Bangkok is to be lighted by electric lights. A company has been organized, and the plant is ordered and will be soon put in operation.

SCHWALBACH AND ZURICH.—It will interest Americans who resort to the baths of Schwalbach (or, Langenschwalbach as it is now officially called) for the treatment of nervous and other complaints, to know that this locality is now easy of access by reason of the opening of the new railway line from Wiesbaden.

The growth of Zurich as a tourist centre has been quite marked of late, the number of tourists registered during the season of 1889 being 123,587 as against 112,426 during the preceding year. The hotels at times were filled to overflowing. The French Exposition no doubt gave some impetus to this movement, but the large outlays made by the city in beautifying its lake-front, provisions for lake excursions, and special excursion trains to near points of interest and beauty, and the centring here of railway lines from Paris, Milan and Vienna, have had much to do with making Zurich one of the most popular and attractive resorts in Switzerland.

Among the great achievements of Swiss enterprise, during 1889, was the opening of the mountain railway leading to Mt. Pilatus, overlooking the Lake of Luzerne.

IRRIGATION.—The Government literature of irrigation has been increased by the publication in quarto form, of a translation of “Irrigation in Egypt,” by J. Barois, Engineer-in-Chief *des Ponts et Chaussées*. The work contains general information concerning Egypt and the Nile, the method of irrigation and description of irrigation works in Egypt, the method of elevating and using irrigation water, the construction and repairs of canals, dikes, etc.

Although basins of submersion form the traditional system of Egyptian agriculture, the practice of irrigation on a vast scale is of very recent origin. For this reason the methods are not yet well planned, and there did not exist, up to the present, rules properly established and sanctioned by long usage for the employment of the water for irrigation, for the rotation of crops on irrigated lands, for the drainage of the soil, and generally for everything which pertains to agriculture.

The publication, which is accompanied by twenty-three plates, was translated by Major A. M. Miller, U. S. A., and was ordered printed by the House of Representatives on account of interest now attached to the subject in this country.

Not less than thirty “irrigation bills” have already been introduced in Congress at this session. The special committee of the Senate appointed at the last session to investigate during the recess the matter of reclaiming arid lands by means of irrigation has a very voluminous report in preparation which will soon be submitted.

It is perhaps a misfortune that the introduction of this great work of water storage in Arizona should have

been deferred by the recent disaster at Walnut Grove dam. "This dam," says Lieut. Glassford of the Signal Corps, "is in the central part of Arizona, not far from Prescott, being about 4,000 ft. above the sea level and with a drainage of 150 square miles. The average rainfall in the mountainous region of the territory is about fifteen inches a year, and the least amount, ten inches, is sufficient to always keep full a reservoir of this kind, and while the dam was built for mining purposes only, the great question of water storage has since been made of such importance that as a secondary means of utilizing the water it had been proposed, and steps were being taken, to build flumes and ditches to the level land suitable for agriculture lower down in the valley of the stream."

COMPRESSED AIR MOTORS.—Mr. J. L. Rathbone, United States Consul at Paris, has made a careful examination of the system of compressed air tramway motors and of the Mékarski system of compressed air applied to locomotives, and demonstrates at considerable length* the advantages of the systems as shown on roads near Paris. The report is technical, and accompanied by drawings. An engineer sent to Nantes to examine Mékarski's compressed air motor reported that "for economy, absolute safety, and ready management it is the best motor now known." H.

* United States Consular Report, February, 1890.



MAP OF ALASKA
 BY I.C. RUSSELL IN 1889
 580,000 = 167 miles : 1 inch

